# UTILITY SERVICES

*Providing Safe, Reliable Services To Your Front Door*

## GOAL

Provide all properties within the town's service area adequate and reliable utility services that meet demand in a customer service oriented manner; and achieve these services through safe, environmentally sensitive, and cost efficient methods by partnering with state and local governments, utility franchises, and other public service entities.

## BACKGROUND

Public utilities available within the town include water, sewerage, solid waste, electrical, natural gas, telephone, and cable television. The town provides the first three services in conjunction with a regional service authority, while private companies under franchise with the town provide the latter four services. Each utility is discussed below except telephone and cable, which, because of their evolving roles in community technology, are discussed in the *Information Technology* chapter.

## PUBLIC WATER SYSTEM

### *Description*

**Water Treatment**

The Town of Blacksburg purchases treated water from the Blacksburg-Christiansburg-VPI Water Authority. The water authority plant is located along State Route 114 in Montgomery County. The water source for the water authority is the New River. The capacity of the plant is approximately 12 million gallons (MG) per day. Current use is approximately six million gallons per day, which is enough capacity to serve projected growth within this plan's 45-year horizon.

***Figure US-1, Water Authority***

**Water Distribution and Storage System**

One hundred and fifty miles of pipeline, five water storage tanks, and three pump stations comprise the town's "high" and "low" water subsystems. The high subsystem generally serves areas of Town that are at an elevation 2,190 feet or greater. It serves an area that follows the ridgeline on the north and east sides of Town, which is also a continental divide. In general, the best location for water

tanks serving the high system are in areas of Town which are at or above 2,300 feet in elevation, such as along North Main Street, northeastern portions of Brush Mountain, and the Municipal Golf Course. Water storage for the high system is provided by the North Main Street tank (0.5 million gallons) which is filled by a pump station located in Highland Park. The Allegheny Heights pump station provides additional water pressure for customers within that neighborhood.

The remaining four tanks -- Highland Park (1.5 million gallons), Neil Street (2 million gallons), Allegheny Heights (1 million gallons), and Laurel Ridge (30,000 gallons) provide water storage for the low subsystem. The low system tanks serve areas that are generally lower than an elevation of 2,200 feet. Areas of Town on the low system that are at or above that elevation include the Laurel Ridge area, North Main Street (in the vicinity of the existing elevated tank), and northern and western portions of Brush Mountain and Price's Mountain. A pump station is located in Laurel Ridge to fill that subdivision's tank. Water tanks are generally placed at elevations that allow them to work in tandem to distribute water by gravity to all service connections. This method of distribution ensures that all Town customers receive the highest quality water in a cost efficient manner.

***Figure US-2,***
***Neil Street Water Tank***

**University Water Storage**

Although the university is within Town, Virginia Tech is not a customer of the town's water system and purchases treated water directly from the water authority. The university's system and Town's low system are interconnected, however, providing a benefit to both the town and campus. Interconnection allows for improved water pressure, frequent turn over of water supply, which prevents stagnation, and alternate sources of water should the distribution system be interrupted.

The university has no water storage tanks, which creates additional demand on the town's storage facilities. Average customer use on the low system requires 6.4 million gallons for 48 hours of storage; however, the available storage capacity is only 4.5 million gallons. Virginia Tech's average water use during the fall and spring semesters requires 2.2 million gallons of storage. Since the university is located at the bottom of the low system service area, their facilities are served first which uses approximately half (2.2 of 4.5 million gallons) of the available storage capacity in Town. Blacksburg and Virginia Tech should discuss how the university can best support the town's water storage needs, either financially or by constructing a water storage tank on university property, and negotiate a water storage agreement.

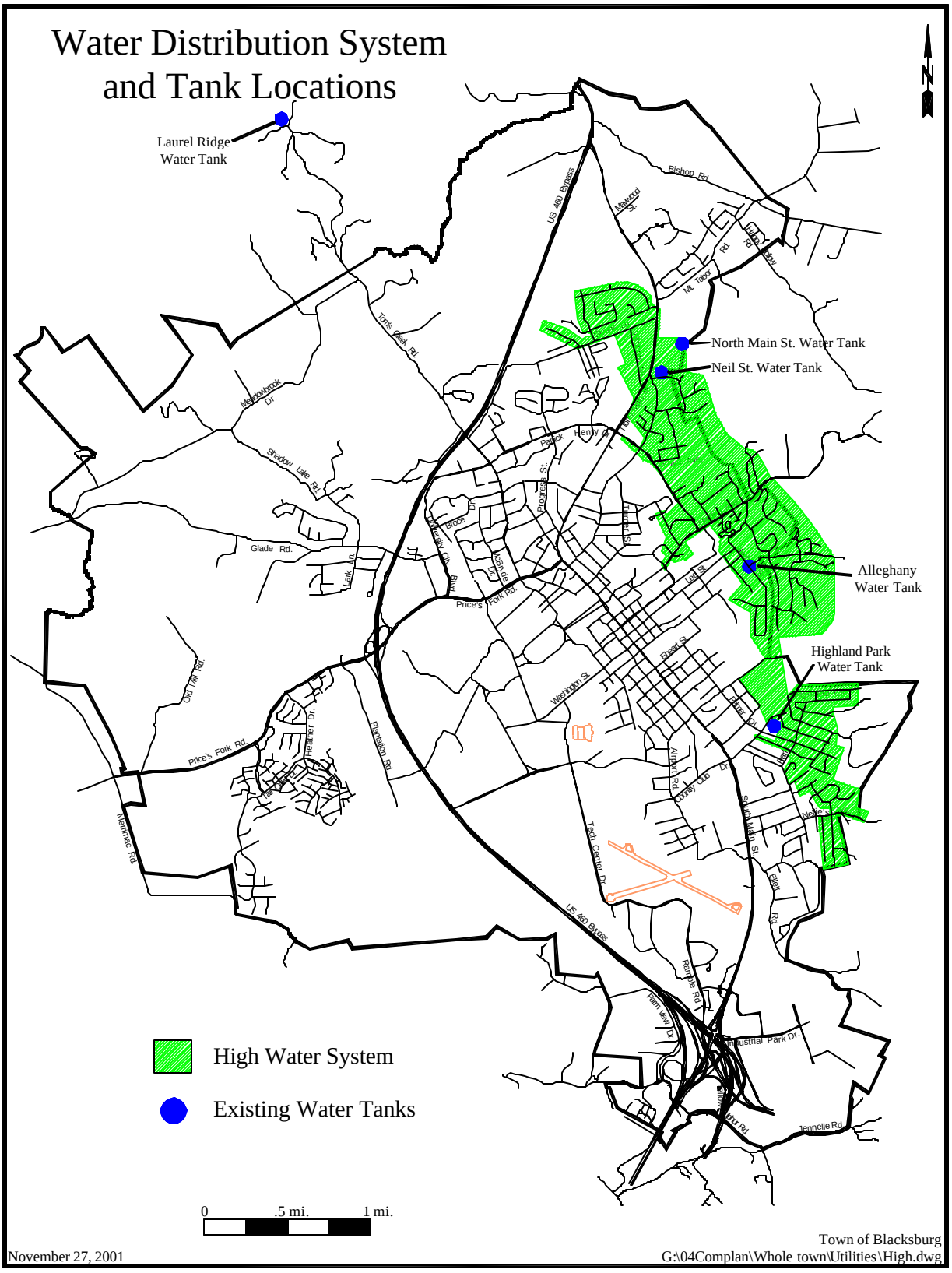


***Figure US-3, Water Distribution System and Tank Locations***

**Fire Protection**

The Fire Suppression Rating Schedule manual, published by the Insurance Services Office, states that the needed fire flow shall not exceed 12,000 gallons per minute nor be less than 500 gallons per minute. The needed fire flow for one or two family dwellings, not exceeding two stories in height, with a distance of 11 to 30 feet between buildings is 1,000 gallons per minute which is the town's design standard for new construction. Fire hydrants within the town are color coded, indicating to emergency personnel the flow available from that location. Green indicates an available flow of 1,000 gallons per minute, orange indicates between 500 and 1,000 gallons per minute, and red indicates less than 500 gallons per minute. The town's fire insurance rating has improved from six to five on a ten point scale, with one being the highest rating.

***Figure US-4, Color-coded Fire Hydrant***

**System Monitoring and Expansion**

The water system is currently monitored through an interactive modeling software program, WaterCAD, that is compatible with the Geographic Information System (GIS). This modeling program enables proposed water main construction to be evaluated for impact on the flows and pressures of the current system. New development demands are modeled to identify the best interconnection with the existing system, and whether off-site improvements will be necessary to support the proposed development. Town Code requires the provision of any off-site improvements necessary to support a new development at the developer's expense. In addition, the code requires that all water main extensions be looped to assure optimal pressure and flow conditions, and to avoid stagnation of water in a dead end main during periods of low flow.

## *Opportunities*

- Significant treatment plant capacity is available for projected water demand.
- The water treatment and distribution system is in compliance with all state and federal regulations as documented in annual water quality reports and confidence report ratings.
- Fire protection is available to most areas of Town and can be extended to all areas with the replacement of the remaining undersized lines (scheduled within the next five years).
- There is inter-jurisdictional cooperation with the Town of Christiansburg and Virginia Tech on the water treatment and distribution system through Water Authority membership.

- There is minimal water loss, or exfiltration, from the town's water system.

- In the mid-1990's, the New Century Council provided the context for expanded inter-jurisdictional cooperation in planning and operating utility infrastructure systems.

## *Challenges*

- A water storage supply and delivery system equal to 48 hours use is necessary to enable interim emergency water provisions to be in place. Current water storage tanks provide service for approximately 24 hours in the event of an interruption in supply.

- Blacksburg is the sole source of water storage for the Virginia Tech campus.

## *What is Changing*

**Water Service Area**
The town's water service area includes areas outside of the corporate limits. The town and the Montgomery County Public Service Authority (PSA) are working on a comprehensive agreement aimed at establishing the boundary of the town's service area outside the corporate limits. This will facilitate service to County areas and identify a clearer procedure for water extension requests. See *Figure US-5* that illustrates current service areas for which agreements already exist.

**Current System Upgrade and Backflow Prevention**
Several programs are underway to maintain the water system and provide optimal levels of service. These include the replacement of water mains less than eight inches in diameter, the looping of dead end lines, the replacement of plastic mains with ductile iron pipe, and the installation of fire hydrants in all neighborhoods. In addition, the town has devoted more staff time to running the Cross Connection Control Program whereby all water connections to the public system are protected with a backflow preventer, appropriately tested, and inspected on a periodic basis. The purpose of this program is to assure that the public water supply cannot be contaminated by back siphonage from a home or industry. The town has managed to protect the majority of its possible contamination sources since its implementation and will be utilizing mailings and technology to further educate the community on backflow prevention.

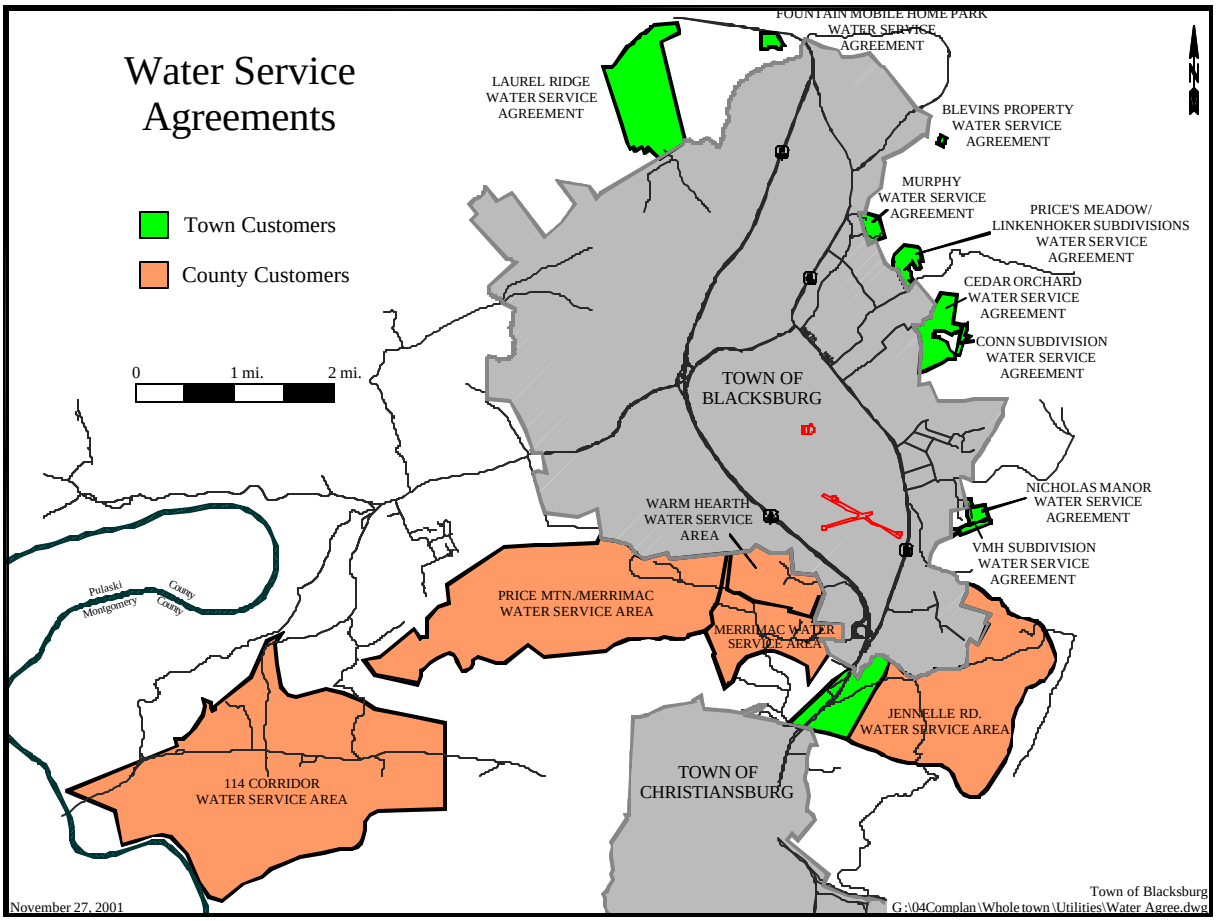


***Figure US-5, Water Service Agreements***

**Water Storage Needs**

In Town, the high system has the least storage available and therefore water shortage emergencies or power outages are more critical to this system. The current number of customers served by the high system is 1,160. In order to provide 48 hours of storage, approximately 1.0 million gallons is required. The current tanks provide 0.5 million gallons. Therefore, in the short term, additional storage capacity of approximately 0.5 million gallons is needed. The high system could ultimately serve an estimated 1,600 additional customers, which brings the total number of users on the high system to 2,760. Additional storage needed at build out on the high system for 48 hours of back up is 1.6 million gallons.

Fifty-one percent of the town's total storage on the low system is used for Town customers. Discussions with Virginia Tech are needed to work out storage capacity needs. The current number of Town customers served by the low system is 6,591. In order to provide 48 hours of storage for the town, approximately 6.4 million gallons is required. The current tanks provide 4.5 million gallons. Therefore, in the short term, additional storage capacity of approximately 1.9 million gallons is desired.

**Water Tank Locations**

Water storage tanks must be located in high elevations to serve nearly all customers in Town through the force of gravity. Storage tanks are required at a variety of locations to serve development townwide with water lines. For this reason, future development plans dictate where tanks will be located. Ideal tank locations have been identified in several areas of Town that reside high enough to serve customers in that area. See *Figure US-6* for ideal tank locations.

# GENERAL POLICIES

- Provide water storage supply equal to 48 hours of service to all areas within the town and its service area in an aesthetically pleasing manner and through methods that are effective during extended power outages and reliable during inaccessible weather conditions. Bury tanks where feasible. Utilize gravity water storage systems. Provide landscaping around tanks that, with maturity, will screen the tank.

- Provide an adequate and reliable water distribution system throughout the town that extends fire protection service to all properties. Require that existing and new mains be looped into existing mains. Use ductile iron pipe in all new main extensions.

- Require new developments to utilize best state-of-the-art pipe in design of the water system.

- Continue to upgrade water pump stations to provide safe and reliable service.

- Maintain water revenues at a level that will support operation, maintenance, and capital improvement needs, and maintain a fee structure where the costs of the water system infrastructure necessary to serve new development are supported by new development.

- Utilize availability fees to fund system capacity improvements and to fund debt service for long term infrastructure improvements.

- Participate with local governments in regional infrastructure planning and to better coordinate extensions across Town boundaries.

- Provide reliable emergency communications through technology to advise utility customers of current or impending interruptions in service.

- Utilize technology to enhance payment options and better educate the public on their water service and programs.

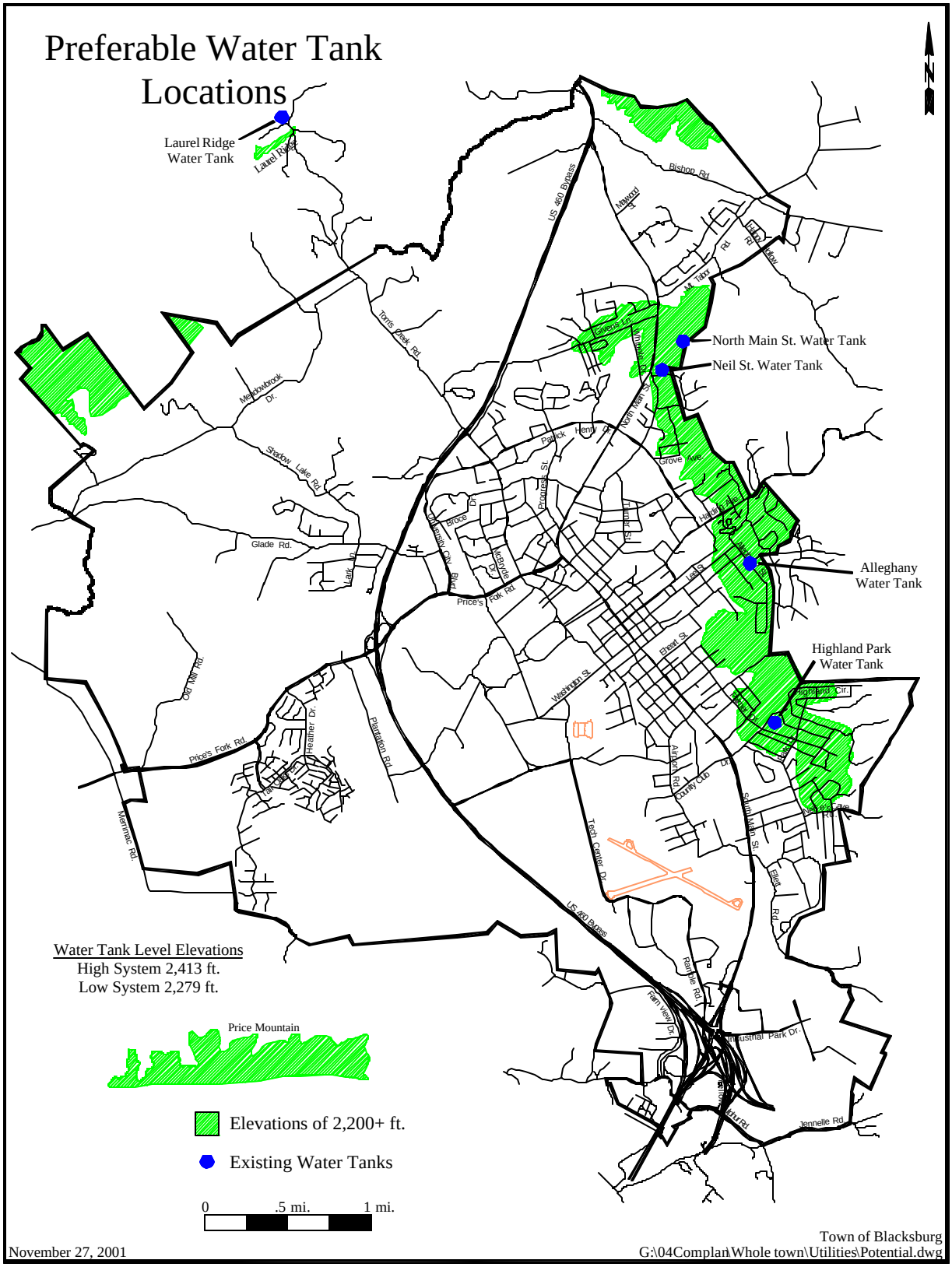


***Figure US-6, Preferable Water Tank Locations***

# ACTION STRATEGIES

## *in general*

- Maintain existing water storage facilities and pump stations by continuing regular inspections and maintenance.

- Continue the water maintenance program for the Geographic Information System.

- Install fire hydrants in existing developments in accordance with the Subdivision Ordinance.

## *within 5 years*

- Coordinate with Virginia Tech for the funding and provision of storage facilities so the university provides for a minimum of 48 hours normal water use.

- Develop a comprehensive agreement with the Montgomery County Public Service Authority to address ultimate service areas for the town system and a process for service requests to areas adjacent to the town boundaries.

- Use technology to better educate the public on cross connection control purpose and requirements. Strengthen the enforcement of the program through education and inspection.

- Continue to expand the emergency communications system in cooperation with emergency services to advise Town utility customers of current or impending interruptions in service, and test the emergency communications system periodically and assure Town utility customers are aware of how to obtain this information.

- Administer a cost-share water extension program to currently developed properties. Owners are responsible for the cost of materials and blasting while the town bears the remainder of the cost and assists the owners with easement acquisition.

- Insure all water customers identified as having high and moderate hazard cross connections are in compliance with the backflow prevention program.

- Construct a 1.5 million-gallon water storage tank on The Hill Municipal Golf Course to serve the high system.

- Replace 3.5 miles of old water line and 50 old fire hydrants on the Town system with new piping and equipment.

- Replace Allegheny water pump station in accordance with current technology and safety standards.

- Upgrade/Replace the old Highland Park tanks in accordance with current technology and safety standards.

- Improve the existing system by increasing main size to a minimum of 8 inches diameter through replacements and maintenance and by creating loops where dead ends exist.

- Install automated telemetry in all pump stations.

- Install a loop connection from the Blacksburg Industrial Park to Yellow Sulphur Road.

## *within 25 years*

- Construct an additional water storage facility at the Golf Course (0.5MG) with screening equal to, or exceeding, existing tanks, and with accommodations for telecommunication antennas.

- Acquire and construct water storage facilities at North Main Street (1 MG), Brush Mountain (2 MG), and Harding Avenue (1 MG). These high system facilities should be constructed to minimize impacts to the surrounding view shed while also accommodating numerous telecommunication antennas.

- Acquire and construct water storage facilities at Laurel Ridge (2 MG), Price Mountain (2 MG), and Brush Mountain (2 MG). These low system facilities should be constructed to minimize impacts to the surrounding view shed while also accommodating numerous telecommunication antennas.

- Install telemetry and pressure gauges at all water tank locations using new technology to expedite alarm warnings and collect data for preventative operation and maintenance.

- Complete the upgrade of the current system to a minimum eight-inch diameter main size with looping of all dead ends.

- Install fire hydrants within all existing developments in accordance with the distances provided in the subdivision ordinance.

- Increase fire flow at the hydrants to a minimum of 1,000 gallons per minute and provide more flow in deficient areas by replacing inadequately sized lines with a minimum of eight inch lines, creating loops in existing and future water mains, and increasing pressure-head with water storage tanks.

## *beyond 25 years*

- Install new water mains to provide a looped system in the following locations:

  - Price's Fork Road to State Route 114
  - Price's Fork Road to Montgomery County Hospital through Merrimac area
  - From Harding Avenue through Luster's Gate to Blacksburg Country Club
  - Mount Tabor Road Connector
  - Mount Tabor Road and Bishop Road

- Acquire and construct water storage facilities at locations to serve the high system based on future development plans. These facilities should be constructed to minimize impacts to the surrounding view shed while also accommodating numerous telecommunication antennas.

- Acquire and construct water storage facilities at locations to serve the low system based on future development plans. These facilities should be constructed to minimize impacts to the surrounding view shed while also accommodating numerous telecommunication antennas.

# PUBLIC WASTEWATER SYSTEM

***Description***

**Wastewater Treatment**

***Figure US-7, Sanitation Authority Plant***

The Blacksburg-Virginia Tech Sanitation Authority treats the Town of Blacksburg's public wastewater. The Sanitation Authority Plant is located where Stroubles Creek crosses Route 659 (Price's Fork Road). The current design capacity of the plant is nine million gallons per day (MGD) which provides adequate treatment capacity for growth projections. The plant has the ability to expand to 12-MGD treatment capacity if necessary for the future. Current flows from Blacksburg, Virginia Tech, and several areas in Montgomery County total 5.5 MGD at the plant. The plant has the ability to store approximately 25 MGD; however, during unusually large wet-weather flows, only an estimated 2.5-MGD increase occurs. Although neither the state nor federal government require it, the plant contains a nitrification/denitrification process that removes 90 percent of the ammonia nitrogen entering the plant and 25 percent of the total nitrogen prior to discharge. This increased level of treatment in the plant provides a benefit to Stroubles Creek, the receiving stream, by helping to preserve its existing stream biology. Sludge removed during the treatment process is incinerated and filtered prior to discharge into the atmosphere. Residents not served by public sewer have privately maintained septic and drainfield systems that accomplish their wastewater treatment by discharging to the soil. Chemical, biological, and filtering processes within the soil naturally treat this discharge.

**Wastewater Collection System**

The town wastewater system consists of approximately 132 miles of sanitary sewer line and pressurized force main. Eighteen pump stations serve the town's sanitary sewer system. They are Shenandoah 1 and 2, Murphy Subdivision, Windsor Hills, Cedar Orchard I, Cedar Orchard II, Highland Park, Forest Hill, Cedar Run, Montgomery Regional Hospital, Brookfield, Strouble's Mill, Gladewood, Westover Hills, Sturbridge, Shawnee, Givens, and Wyatt Farms. Additionally, the town will maintain and operate public septic tanks and pressurized force main lines on a Septic Tank Effluent Pumping or Gravity (STEP or STEG) system in the Village at Tom's Creek Planned Development in the Tom's Creek Basin. The majority of the septic tanks contain submersible pumps, while several tanks run gravity into the force mains. All of the submersible pumps and pump stations feed to the Stroubles Creek Basin system, which gravity flows to the Sanitation Authority Treatment Plant.

**Wastewater Service Area**

The Town of Blacksburg serves roughly 4,300 acres with sanitary sewer in the town limits (approximately 35 percent of Town). Sewer service is available to most of the land area within the corporate limits east of the Route 460 Bypass, and a few areas west of the Bypass. Several areas west of the Bypass in the Tom's Creek Basin are serviced by pumping stations or septic tank submersible pumps that transfer sewer effluent back into the Stroubles Creek Basin. The remainder of the Tom's Creek Basin is unsewered along with areas on the northern end of Town bordering North Main Street and the area south of the Industrial Park within Town. Areas outside of the corporate limits that are served by the town are the Murphy, Cedar Orchard, Price's Meadow, and Windy Ridge subdivisions. These areas total approximately 160 acres. See *Figure US-8* for the delineation of areas outside of Town that currently has service agreements.

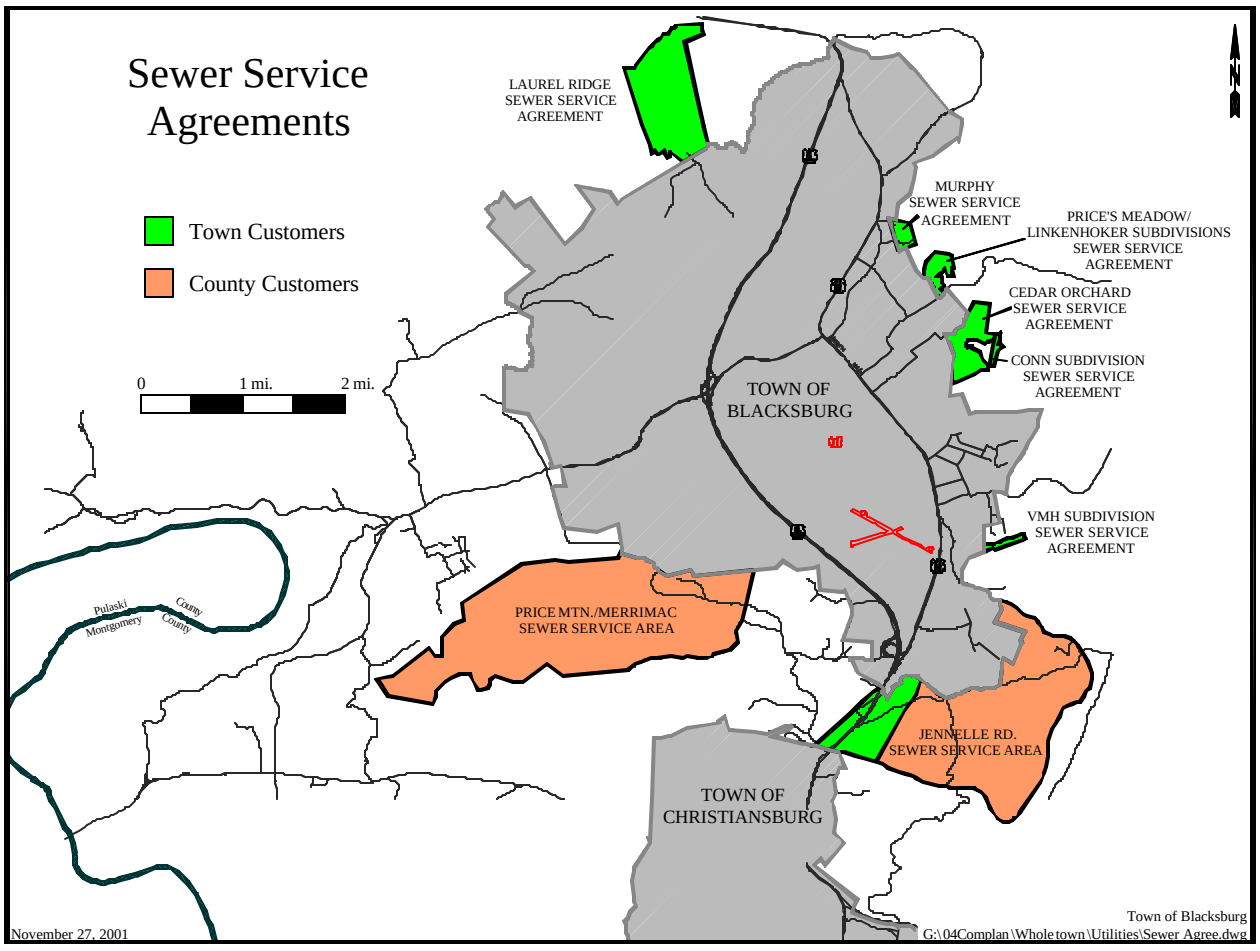


***Figure US-8, Sewer Service Agreements***

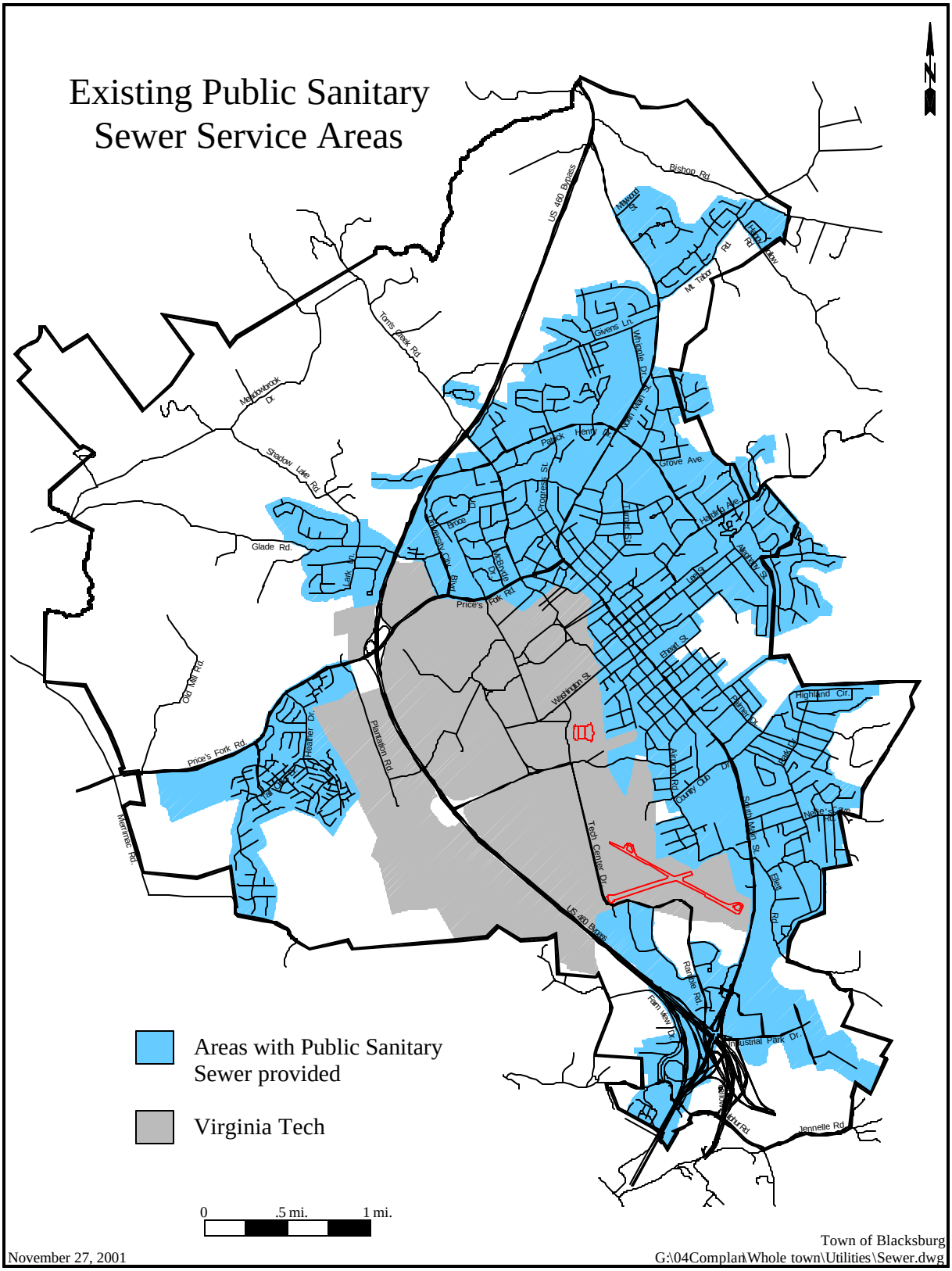


***Figure US-9, Existing Public Sanitary Sewer Service Areas***

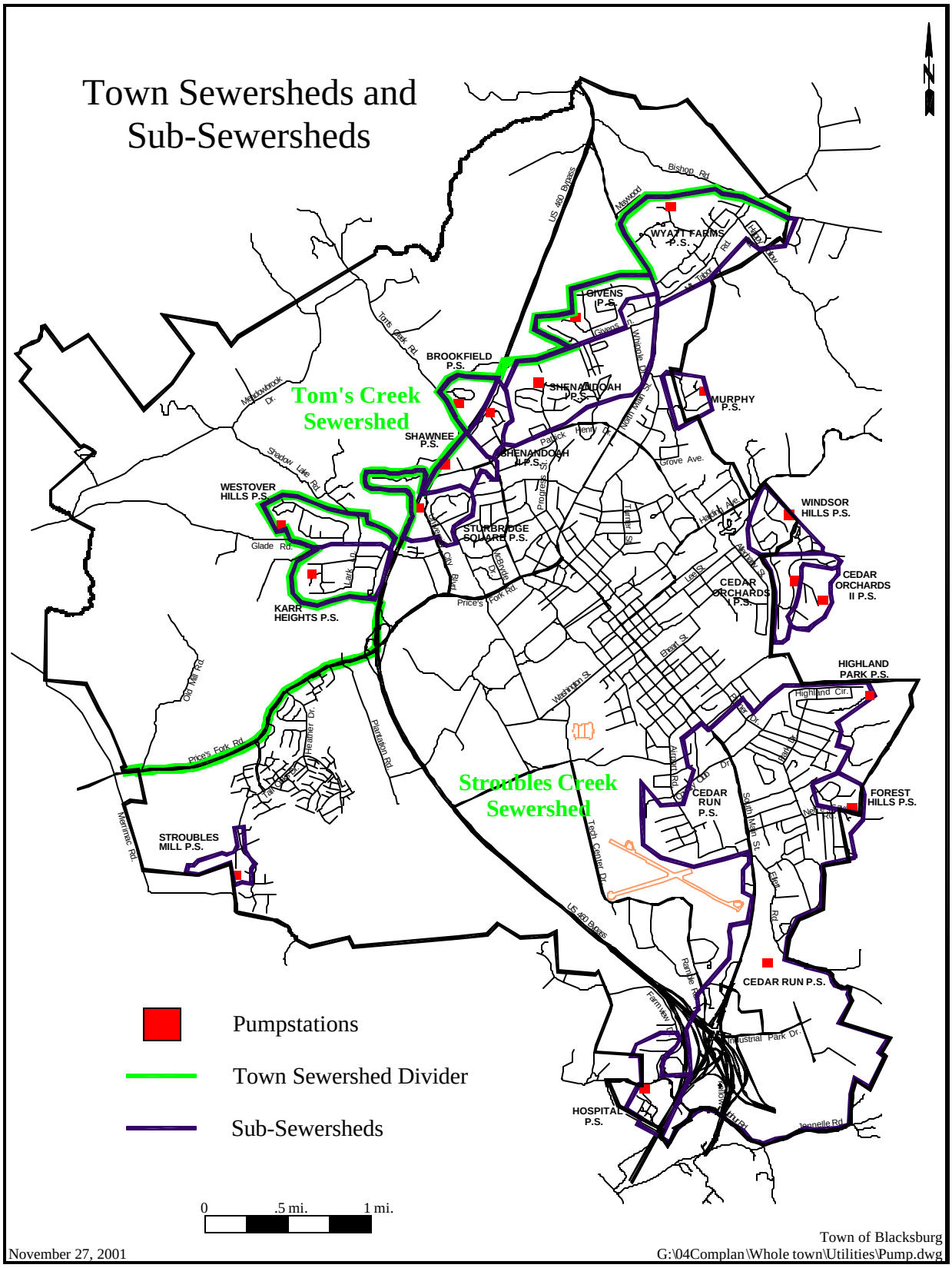


***Figure US-10, Town Sewersheds and Sub-Sewersheds***

**Wastewater System Analysis**
Town Code requires any off-site sewer system impacts to be included as a cost of development proposals. An interactive sanitary sewer system model is used to analyze the effect of new development on the existing system and to identify necessary upgrades. The model monitors the system for potential surcharge areas and capacity constraints. This enables more accurate and cost effective system maintenance, and more precise evaluation of development impacts on the system downstream. Additionally, Capital Improvement Projects are realized through this modeling analysis.

**Wastewater Monitoring**
The town and the Blacksburg-VPI Sanitation Authority monitor wastewater effluent from significant wastewater dischargers. The town requires customers discharging more than 25,000 gallons per day of sewerage or those discharging potentially hazardous materials to the public sewer system to be permitted. Permits may require a sewer customer to test their effluent daily, weekly, monthly, or quarterly for specific constituents identified in the permit. For example, metal-plating industries that clean their products with a wash water may be monitored for zinc levels in their effluent. All new industries or businesses in Town are evaluated for discharge quality and quantity prior to receiving approval. Where discharge quality is poor, the sewer customer may be required to treat the wastewater prior to discharging it to the town's sewer system, commonly known as "pretreatment". The Town currently monitors nine sewer customers with operating discharge permits.

## *Opportunities*

- Significant plant capacity is available for projected wastewater treatment demand.

- The sanitary sewer system is in compliance with all state and federal regulations, and the wastewater treatment plant exceeds its state and federal requirements with its ammonia nitrogen removal system.

- A Septic Tank Effluent Pumping (STEP) system exists in the Tom's Creek Basin as a pilot program and an alternative sewer working group has researched other wastewater systems. This provides the town with an opportunity to broaden its wastewater options, to consider costs and environmental issues, and to explore innovative systems for the Tom's Creek Basin.

- The town participates and cooperates with Virginia Tech on the sanitary sewer system through the Blacksburg/VPI Sanitation Authority.

- The industrial pretreatment program is effective in protecting the integrity of the sanitary sewer collection system and treatment plant.

- The New Century Council provided the context for expanded inter-jurisdictional cooperation in planning and operating utility infrastructure systems.

## *Challenges*

- Creating a sanitary sewer model that is compatible with the Geographic Information System and that utilizes the data already available.

- Public sewerage service is unavailable to 90 percent of the land area west of the Route 460 Bypass.

- Funding an environmentally sensitive public wastewater service to the Tom's Creek Basin where initial construction, operation, maintenance, and long term replacement costs do not significantly increase rates to the rest of Town.

- Sections of the older central Stroubles Creek sewer collection system and pump stations are stressed due to age, condition, infiltration, and the proliferation of pump stations adding flow from outside the natural drainage area for which the system was designed. In addition, some sanitary sewer backups occur due to inflow and infiltration.

- Sections of Sanitation Authority Lines through campus need upgrading to alleviate capacity problems in Town.

## *What is Changing*

**Public Wastewater Area**

Blacksburg has obtained new wastewater service areas both within Town and out of Town through negotiations with the county (See *Figure US-8).* In addition, service is provided to existing areas in Town through capital improvement and cost share projects. Planning for the construction of a public wastewater service in the Tom's Creek Basin is one of the town's major wastewater projects. Council is seeking the best option taking into consideration cost, environmental impact, reliability, and feasibility. Council is carefully evaluating several options. One option would utilize alternative, decentralized sewer technologies and treatment that as recommended by the Tom's Creek Basin Wastewater Working Group. Another option is the construction of a centralized sanitary sewer trunk line with a pump station use to transport wastewater to the treatment plant. A final option is a hybrid wastewater system that combines small-diameter pressure collection lines with a central pump station that also transports effluent to the treatment plant. Benefits of an alternative, decentralized system include lower

collection costs, utilization of innovative technologies, and efficient on-site treatment of wastewater effluent. A hybrid system would also include lower collection costs while employing innovative technology. In contrast, a centralized, gravity line option efficiently utilizes the available capacity and advanced treatment processes of the treatment plant, and will eliminate most of the town's sanitary sewer pump stations thereby reducing capacity pressure on the Stroubles Creek trunk line. Any of the above options will enable clustered, residential development, in this area of marginal septic sites, and meet the community's vision for sensitive development and the preservation of open space throughout the Tom's Creek Basin. The following analysis is one possible build-out scenario that would preserve over 50 percent of the land as open space, cluster development, and efficiently utilize any of the above public wastewater systems (See *Figure US-11*).

**Current System Upgrade**

Programs to evaluate and correct excessive inflow and infiltration into the sanitary sewer system include a root control maintenance program and the replacement or lining of aged or damaged pipes. Inflow and infiltration are monitored through the use of a camera, smoke testing, and dye testing. Lines that are identified as having excessive inflow and infiltration are replaced or lined using innovative technologies such as in-situ form lining. Town staff works with homeowners to develop alternative discharge points for roof drains, sump pumps, and other inappropriate connections that impact the system's limited capacity. The existing sanitary sewer lines in the Stroubles Creek sewershed will need to be upgraded if offloading is not achieved from the Tom's Creek sewershed.

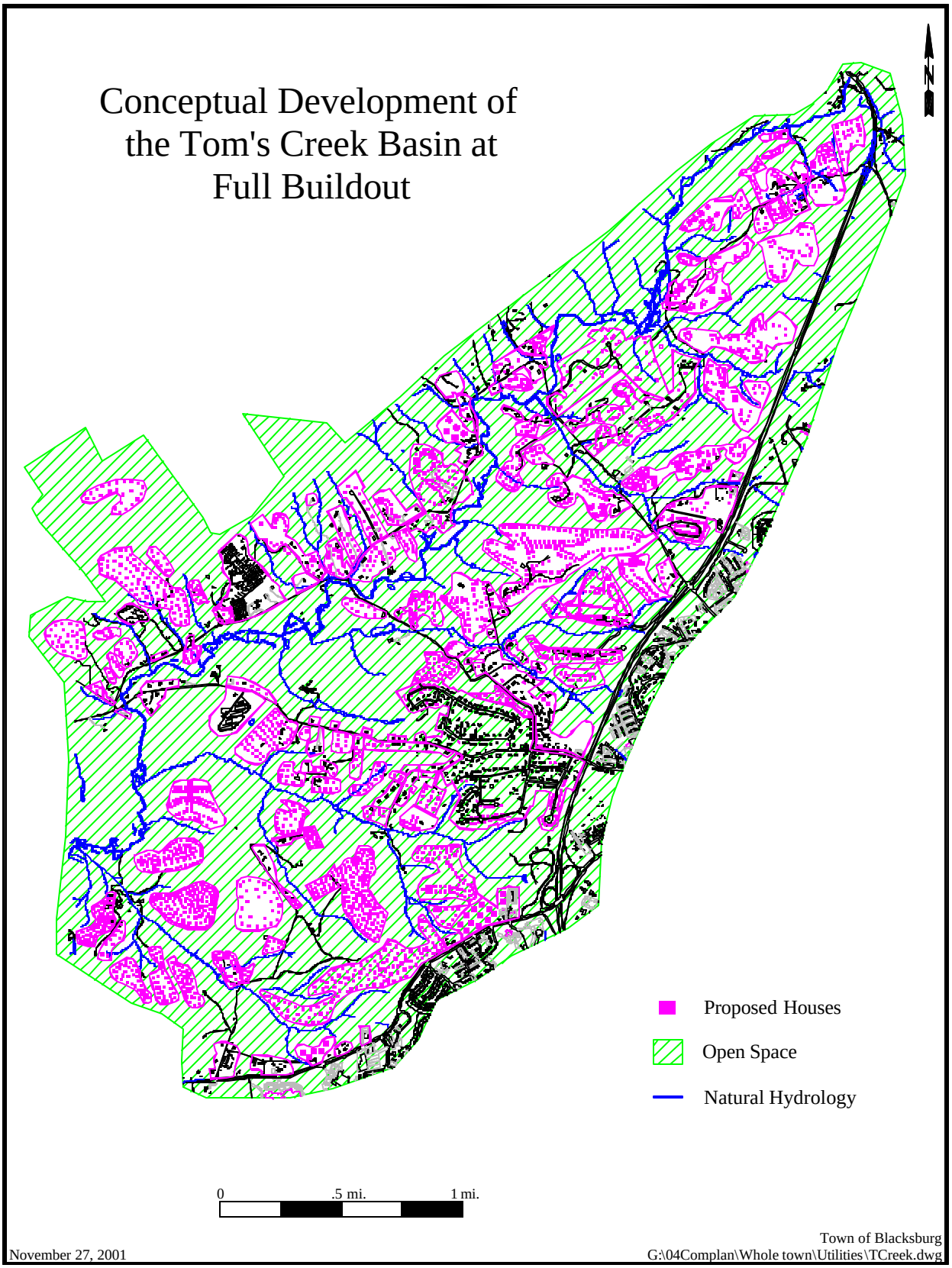


***Figure US-11, Conceptual Development of the Tom's Creek Basin at Full Buildout***

# GENERAL POLICIES

- Provide a reliable public wastewater system and cost effective service that is in conformance with all state and federal regulations.

- Participate with local governments in regional infrastructure planning, and to better coordinate extensions across Town boundaries.

- Provide public wastewater service to all areas within the town: to the Tom's Creek area and the 1998 boundary adjusted area utilizing the Capital Improvement Program; to already developed areas of Town on a cost share basis; and to new development areas at the developer's expense.

- Require developers to provide the necessary wastewater provisions as a condition of development approval where system upgrades or pump stations are necessary to achieve public on-site sewerage.

- Require new, unsewered developments to provide a wastewater collection system on-site to enable connection to a public wastewater system once it becomes available.

- Provide a safe, efficient, and easy to maintain sanitary sewer pumping system by reducing reliance on pump stations where possible, replacement of existing underground pump stations with ground level pump stations, and utilizing current technology.

- Maintain sewer revenues at a level that will support operation, maintenance, and capital improvement needs, and maintain a fee structure where the costs of the sewer system infrastructure necessary to serve new development are supported by new development.

- Encourage industrial process water recycling to reduce wastewater volumes and treatment demand.

# ACTION STRATEGIES

## *in general*

- Maintain sewer revenues at a level that will support operation, maintenance, and treatment costs.

- Administer a cost-share sewerage extension program to currently developed properties. Owners are responsible for the cost of materials and blasting while the town bears the remainder of the cost and assists the owners with easement acquisition.

- Calculate availability fees, based upon peak usage rate, for the costs of wastewater system capacity that are needed to fund long-term infrastructure improvements.

- Maintain existing pump stations with daily maintenance and inspections.

- Replace broken lines and inadequate lines as identified through regular inspection and maintenance schedules.

- Maintain a sewer washing and root-cutting program in older sections of the sewer system to preclude stoppages.

- Reduce infiltration by manhole waterproofing and lining critical pipes where replacement or repair is not feasible due to depth or traffic interruption.

- Consider the impact that all plans, engineering, and design work have on the Stroubles Creek sewer collection lines that are currently at capacity in many areas.

### *within 5 years*

- Continue to expand the emergency communications system in cooperation with emergency services to advise Town utility customers of current or impending interruptions in service, and test the emergency communications system periodically and assure Town utility customers are aware of how to obtain this information.

- Develop a comprehensive utility agreement with the Montgomery County Public Service Authority to establish an ultimate service area for the town system and a process for service requests in areas adjacent to Town.

- Assess areas of excessive inflow and infiltration through periodic flow measurement and reduce infiltration and inflow in the town's sanitary sewer system. Encourage a similar policy from the Authority on the Stroubles Creek trunk lines.

- Develop an annual inspection and maintenance program for the existing system based upon the priorities identified through modeling of the system.

- Enable utility bills to be paid through the Blacksburg Electronic Village, Town web site, or through automatic deductions from financial institutions.

- Evaluate decentralized sewer technologies, gravity sanitary sewer systems, and a hybrid system utilizing the STEP method to determine the most effective wastewater service and funding option for the Tom's Creek Basin.

- Implement, monitor, and maintain a Septic Tank Effluent Pumping or Gravity System (STEP/STEG) in the Village at Tom's Creek Development as a town pilot program.
- Consider implementation, monitoring, and maintenance of a decentralized wastewater system.
- Design and construct a gravity sewer system to the 1998 boundary adjusted area in the industrial park.
- Replace and upgrade with current technology the Forest Hills, Murphy, and Shenandoah pump stations along with the Givens generator.
- Offload, replace, or upgrade sections of gravity sewer lines in the Stroubles Creek sewershed identified as being at capacity in the CIP.
- Install automated telemetry in all pump stations for remote monitoring.
- Amend the *Town Code* to allow developers who construct portions of a planned public sewer trunk line to be reimbursed on a pro rata basis by future developers as they connect to the trunk line and modify the Subdivision and Zoning ordinances accordingly.

### *within 25 years*

- Increase capacity on the Stroubles Creek sanitary sewer system by either upgrading lines or by off-loading wastewater loads to other sewerage systems or basins.
- Upgrade all underground pump stations. Replace pump stations with gravity connections where feasible to increase the reliability of the public wastewater system.
- Participate with the sanitation authority to evaluate the region's rate of development and identify a horizon for upgrading the treatment facility.
- Begin construction of a public wastewater service in the Tom's Creek Basin as funding allows.

### *beyond 25 years*

- Eliminate all inflow and infiltration within the system before peak inflows exceed pipe capacity.
- Complete construction of a public wastewater service in the Tom's Creek Basin.
- Install remote flow sensing to target breaks and excessive flow rates for immediate maintenance.

# SOLID WASTE MANAGEMENT

## *Description*

### Solid Waste Disposal

The town is a member of the Montgomery Regional Solid Waste Authority, which was created in December 1994. Member jurisdictions are Blacksburg, Christiansburg, Montgomery County, and Virginia Tech. A five-member board oversees the Solid Waste Authority. Each member jurisdiction appoints one member, and the fifth member is jointly appointed by all jurisdictions. Funding for the Solid Waste Authority is provided solely through tipping fees and recycling revenues. The mid-county landfill, operated by the Authority, closed in 1998. The Solid Waste Authority is now a member of a regional landfill and has constructed a transfer station at the former landfill site. The Solid Waste Authority provides disposal services for the member jurisdictions through the use of their transfer station. Solid waste is disposed of at the Cloyd's Mountain Landfill in Pulaski County. The 2001 tipping fees charged at the Solid Waste Authority's transfer station were $49 per ton for solid waste and $38 per ton for brush that is chipped and made available to the public for a fee.

***Figure US-12, Conveyor Belts***

### Refuse Collection-Residential

The town provides refuse collection through a private contractor to approximately 5,000 single-family residences weekly. A fee is charged along with the water and sewer bill on a monthly basis, which supports the total cost of the refuse collection and disposal. Currently, the fee is on a per residence basis for as many as three containers weighing up to 75 pounds each.

***Figure US-13, Residential Refuse Pickup***

### Refuse Collection-Commercial

In commercial, industrial, and multi-family apartment complexes, refuse service is privately contracted directly by the owner or property manager. This is generally a dumpster service. Companies providing refuse collection services in Blacksburg for dumpsters include Bob's Refuse Service, Waste Management, and BFI.

***Figure US-14, Commercial Refuse Collection***

**Recycling Program-Residential**

***Figure US-15, Residential Recycling***

For over 20 years, through volunteer efforts, recycling has been a way of life for many residents in Blacksburg. In 1991, the town initiated a weekly curbside recycling service to all single-family residences, supported by the monthly refuse and recycling collection utility fee. In 2001, this program collected commingled containers (aluminum, tin, steel, bottle glass, and two types of plastics collected together), newsprint, white paper, magazines and catalogs, and corrugated cardboard separated by the homeowner in Town-provided recycling bins. Additionally, the town provides monthly brush collection service to curbside customers, leaf collection during the fall season, and Christmas tree recycling after Christmas. Christmas trees collected are chipped into mulch for use on Town properties.


***Figure US-16, Leaf Collection***

The brush from the Brush Collection and Fall and Spring Cleanup programs is collected and transported to the Solid Waste Authority where it is chipped and made available to the public, for a fee, as mulch. The costs to provide brush collection and Spring and Fall cleanup are funded through the monthly refuse service fees paid by residents. The service is very labor intensive because of the distance to and from the Solid Waste Authority.

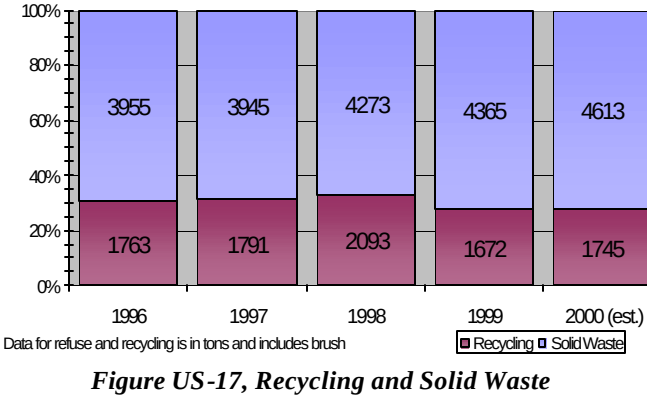

***Figure US-17, Recycling and Solid Waste***

By combining recycling efforts from the curbside residential and brush collection programs, Blacksburg recycled over 30 percent of its total residential waste stream from 1996-2000. This will help the Montgomery County region to meet its State mandated recycling goal of 25 percent.

**Recycling Program-Commercial**
In multi-family apartment complexes, the landlord or property manager provides recycling, generally in a voluntary drop-off type program. Apartment complexes are required to provide on-site recycling collection sites for their residents and to have a recycling program that is consistent with the town's program.

**Regional Recycling and Processing**
In 2000, the Montgomery Regional Solid Waste Authority Recycling Center processed aluminum, steel, scrap aluminum and foil, iron, copper, brass, aluminum radiators without steel parts, white goods, and other ferrous metals, plastics (#1 and #2), three colors of glass, newsprint, sorted office paper, magazines and catalogs, corrugated cardboard, used motor oil, antifreeze, automobile batteries, textiles, tires, and chipped brush for mulch.

Various initiatives are underway to reduce household hazardous wastes from being disposed of in the landfill. Also beginning in 2000, Montgomery County and the towns of Christiansburg and Blacksburg joined together to provide a countywide collection day for household hazardous wastes available to all Montgomery County residents. Previously, this service had only been available to Blacksburg refuse and recycling customers. Another initiative includes a latex paint exchange sponsored by the Montgomery County Improvement Council each spring.

**Townwide Cleanups**
Cleanups are provided each fall and spring, to Town refuse customers only, where Town crews will collect, without additional charges, large bulky items from the curbside for recycling or disposal. Items that are collected during these programs include white goods such as stoves and refrigerators, tires, old furniture, lumber, brush, and other large items which cannot be collected in the weekly refuse collection service. Additionally, appliances and brush collected during cleanups are recycled.


***Figure US-18, Fall Cleanup***

**Adopt-A-Park**
Modeled after the Department of Transportation's Adopt-A-Highway program, Blacksburg's Adopt-A-Park program offers interested individuals, groups, and organizations a way to beautify Blacksburg. Blacksburg's program features two options: litter control and seasonal projects. For the litter control option, an adopted area is cleaned regularly of any litter that may have accumulated. The seasonal project option includes such activities as playground painting, mulching, and other tasks. Adopted areas can include public areas such as roadways, parks, bus shelters, and bike trails.

Participants include businesses, church groups, scouting groups, homeowners associations, fraternities and sororities, and many other organizations from Virginia Tech. Originally named "Adopt a Blacksburg Spot", this program has been in existence since 1990. Many of the participating groups also take part in Montgomery County's annual spring cleanup event, Broomin' and Bloomin'.

**Revenue Source**
The Waste Management Fund is an enterprise fund whereby all fees collected for refuse service and the revenues received from the sale of recycled materials are the only funds used to support refuse and recycling programs. Those fees are used for no other purpose. This fund, initiated in 1993, is in compliance with the adopted financial principles of the town.

## *Opportunities*

- The community is progressive in waste reduction efforts and is environmentally conscious.

- The town participates with Christiansburg, Virginia Tech, and Montgomery County in the solid waste disposal system.

- The Solid Waste Authority has constructed a regional recycling facility. This facility has the capability to accept and process materials from the New River Valley and beyond. A higher quality of product, price, and market reliability can be obtained with higher quantities of materials to recycle.

## *Challenges*

- Solid waste must be transported out of the county for disposal, which introduces additional costs.

- Brush collection is very costly and labor intensive because of its transportation to the chipping facility.

## *What is Changing*

**Park Recycling**
Recycling of beverage containers is being introduced into parks on an experimental basis. Temporary collection containers have been placed at park shelters and beside trash receptacles. If usage is high and contamination is low, permanent recycling collection containers will be investigated for use throughout the park system.

***Figure US-19, Park Recycling***

**Waste Reduction Education**
To achieve a higher level of environmental awareness, educational efforts are emphasized in the town and region. Source reduction is the first step, followed by reuse, and then recycling. As part of the Authority, the four jurisdictions of the Montgomery region have combined recycling efforts to strengthen their representation in the recycling industry and enable larger volumes of materials to be batched. This economy of scale creates better marketability and a more regional coordination of programs, which improves cost effectiveness.

# GENERAL POLICIES

- Promote waste reduction, reuse, and recycling on a town and regional basis.
- In cooperation with the Solid Waste Authority, expand the types of materials recycled.
- Promote economic growth in the region by creating a stronger market for recycled items.
- Support alternate methods to landfilling solid waste to help conserve natural resources and help extend the life of the landfill in an environmentally responsible manner.
- As a member of the Montgomery Regional Solid Waste Authority, develop long-term waste management and disposal strategies.
- As regional waste collection practices become more uniform, contract regionally for collection services to increase cost effectiveness.
- Establish rates that support current year operating costs, including payment to the Solid Waste Authority for tipping fees, curbside refuse and recycling collection, Town cleanups, and other recycling operations.

# ACTION STRATEGIES

## *in general*

- Purchase, whenever possible, products that can be recycled in one of the categories that the Montgomery Regional Solid Waste Authority accepts.
- Encourage the use of recycled materials by businesses and residences.
- Encourage the Solid Waste Authority to explore alternatives to landfilling, such as solid waste composting, incineration, and waste to energy methods that promotes the conservation of resources.
- In conjunction with the Montgomery Regional Solid Waste Authority, sponsor promotional activities such as an annual recycling Expo for regional business owners and a Recycler of the Year recognition dinner for a local business owner.
- Promote on a regional basis the collection and recycling of fuel and oil filters.
- Support waste management and recycling education in public schools by staff presentations, tours of recycling and solid waste facilities, implementing demonstration projects at schools, and emphasizing source reduction.
- Promote waste management through the Chamber of Commerce, business licensing office, Merchants Association, etc.
- Educate the business/commercial sector on the savings in disposal costs and potential revenues associated with recycling cardboard and office paper.
- Provide household hazardous waste collection day and other regular events to collect special materials, in cooperation with the Solid Waste Authority.

## *within 5 years*

- In accordance with the Downtown Master Plan, establish consolidated sites in the downtown area for refuse and recycling for businesses.
- Establish alternate methods of managing yard waste debris, to achieve a comprehensive yard waste recycling program.
- Research the options for business donations of non- or limited perishable food items for shelters.
- Assist the Montgomery Regional Solid Waste Authority in investigating options for reusing or recycling electronics.

- Fund refuse and recycling program education, expansion, and monitoring of various projects through monthly user fees.
- Sponsor regular television programs on waste reduction, reuse, and recycling highlighting local businesses on their recycling efforts.
- Improve the recycling section of the town web site and include activities and pictorial representations of the recycling guidelines.
- Investigate options for a joint composting facility in conjunction with Virginia Tech for yard wastes and brush.
- Aggressively promote safe alternatives to common household chemicals and the proper handling of household hazardous materials.
- Expand Household Hazardous Waste collection to a quarterly schedule.
- Establish common drop-off sites for unwanted bagged grass clippings and leaves throughout the town.
- Build additional bins and designate additional sites for textile drop-offs for residents.

### *within 25 years*

- Purchase a mobile heavy-duty chipper/shredder for weekly brush collection and to implement an on-site mulching/chipping program for residents.
- In cooperation with the Authority, establish a centralized location to house reusable materials for salvage such as a regional "salvage yard," "second life," or "reuse center/warehouse" for applicable construction materials, appliances, and other recyclables.
- Establish a pay-as-you-go system for refuse disposal whereby residents are billed based upon the amount of waste generated.
- Market all plastics collected from the region for recycling.
- Include and actively promote the collection of old furniture and mattresses for recovering textile and other recyclable materials during the clean-ups.
- Develop a comprehensive food waste composting program with Virginia Tech and other local governments.
- Designate one day a month as household hazardous waste collection day.

## *beyond 25 years*

- Designate a centralized collection site to recycle food waste collected from restaurants, dining halls, schools, and residences.

- Arrange alternatives to food waste disposal by contacting farmers who can use food waste as feed for their animals.

- Establish a regional composting facility as a cooperative effort between the town and the Montgomery Regional Solid Waste Authority at which residents may drop off unwanted yard waste debris and pick up finished compost.

# ELECTRICAL SERVICE

***Description***

**Electric Service Areas**

American Electric Power Company and Virginia Tech Electric Company provide electric service to Blacksburg. Generally, the central area of Town is served by Virginia Tech Electric including campus, the Corporate Research Center (CRC), the Gables Shopping Center, Silverleaf townhomes, Patrick Henry Centre, and McBryde Village. The rest of Town is served by American Electric Power. Historically, the electric rates charged are among the lowest in the country.

***Figure US-20, Power Lines***

**American Electric Power Franchise**

American Electric Power (AEP) electrical service is provided to approximately 9,000 customers within the town under a 40-year franchise that extends until November 14, 2012. Service is provided from 138 Kilo-volts (kV) to 69 kV transmission lines into Town at five substation locations: North Blacksburg, Merrimac, Prices Fork, Mount View, and Ellett. The 69 kV line is converted to 12 kV for distribution to AEP customers. All new load additions are reviewed to insure adequate supply.

***Figure US-21, Mount View***

**Virginia Tech Electric Franchise**

Virginia Tech Electric provides electrical service to the campus and approximately 5,500 customers within the town under a ten-year franchise that expires on July 1, 2006. Virginia Tech Electric generates electricity on campus with a coal fired furnace and is fed with 69 kV from American Electric Power Company at two separate 69 kV sources located at the Tech Power Plant and CRC/Tech Center Drive areas. A new substation will be located near the campus power plant at the intersection of Perry Street and Turner Street to obtain more capacity and circuit capabilities.

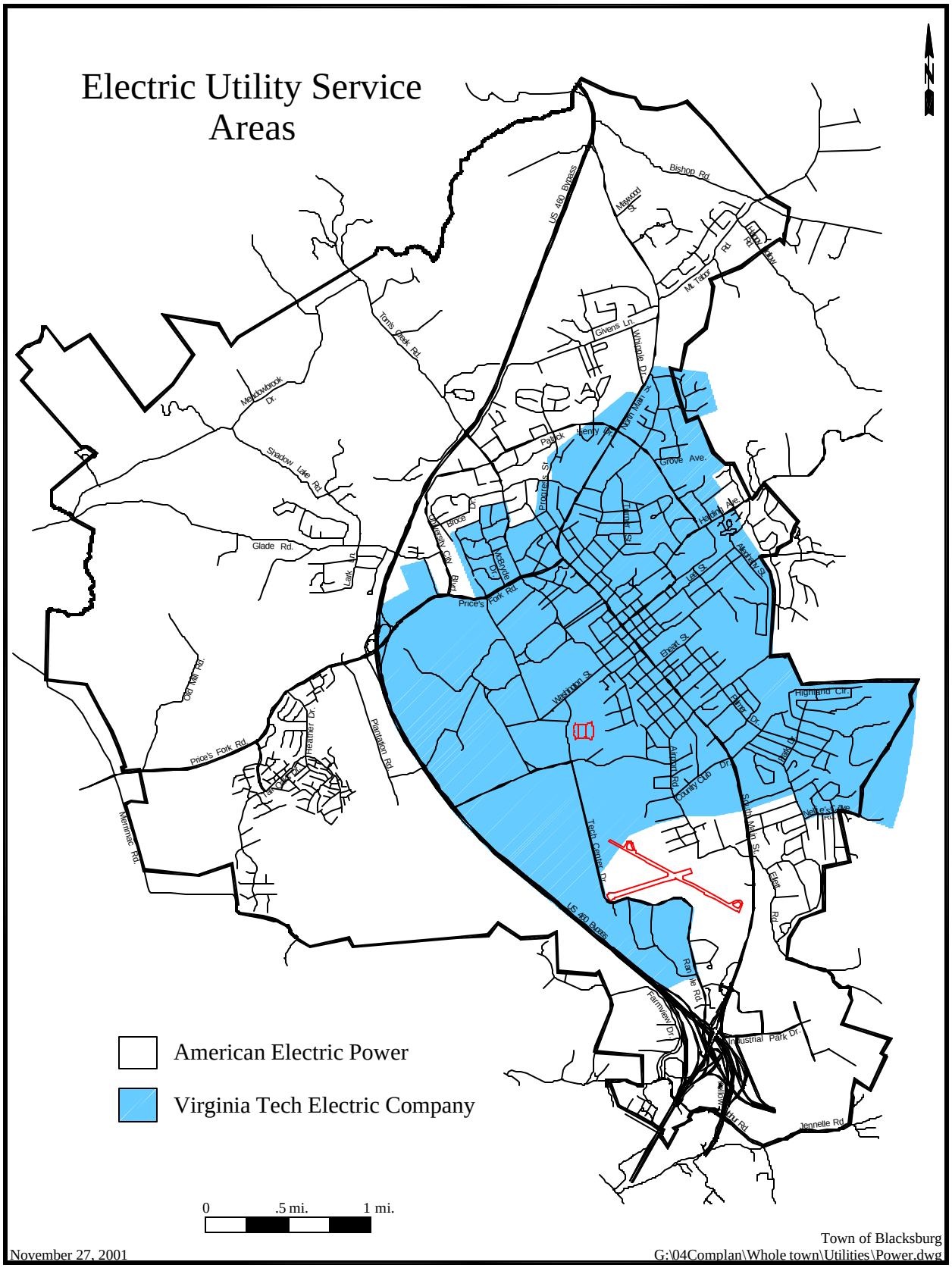


***Figure US-22, Electric Utility Service Areas***

**Overhead versus Underground Facilities**

Electric facilities within Town are both overhead and underground. In 1972, the town adopted a subdivision ordinance that required all electrical service in new subdivisions to be provided underground. As a result, there are few overhead lines in newer areas of Town. The town has allowed relocations to remain overhead in areas that are primarily served with overhead facilities, but the community is increasingly supportive of undergrounding all utilities. This preference was heightened during the ice storm of 1994 when numerous overhead lines were downed by falling trees and limbs. Many neighborhoods in Town were without electricity during this winter storm for up to a week. The town has considered, and funded where appropriate, the undergrounding of utilities in conjunction with road improvement projects. For example, the South Main Street widening enabled telephone lines to be rerouted underground, and the primary electrical service to be relocated away from this entrance road corridor. The Clay Street extension will allow overhead lines to be placed underground as well.

**Street Lighting**

The town provides street lighting through service contracts with each electric utility. In general, Illuminating Engineering Society (IES) standards are used for the design and placement of street lighting. A sodium vapor source is used with a standard roadway, sharp cutoff cobra head-type light in most areas. In the downtown commercial area, period post-top lights are used with a white, metal halide source. The town installs streetlights on new and improved collector and arterial roads. In addition, streetlights may be requested by citizen petition for local roads. The petition process requires that 75 percent of the adjacent property owners support the request. Requested streetlights are installed on a first come basis as funding allows. Street light installation funding is generally programmed in the Capital Improvement Plan based upon requests received.

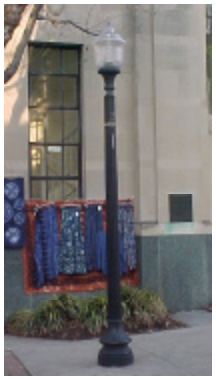

***Figure US-23, Post-top Light***

***Figure US-24, Cobra Light***

## *Opportunities*

- Electrical service charges have remained among the lowest in the country.
- American Electric Power has looping capabilities around Blacksburg.
- Virginia Tech Electric installs looping capacity at all available opportunities.
- Electrical distribution and service lines are underground in new developments and in areas constructed since the early 1970's.

## *Challenges*

- Maintaining low electric rates after deregulation.
- Eliminating all overhead power lines.
- Diversifying energy sources to reduce the need for traditional fossil fuel generated electricity.

## *What is Changing*

**Electric Service Enhancements** - *American Electric Power*
American Electric Power has added two new substations, Mount View and Ellett, within the past five years. Continuous load monitoring and planning will determine future needs for capacity additions as well as alternate feed capabilities.

**Electric Service Enhancements -** *Virginia Tech Electric*
There is potential for significant load growth on the main campus and Corporate Research Center. A new substation is planned to come on line in 2001 due to space and capacity requirements. This will increase the available load and circuitry to both the town and campus while providing more reliability on the system. A major goal for Tech Electric in this decade is to maintain the campus circuit reliability while providing for 50 percent load growth on campus. Another major goal is to provide improved service reliability to Town customers to reduce the number and duration of outages, and to meet a projected 35 percent load growth.

Tech Electric anticipates that the South Main Street area has the potential for significant load growth. Station to station ties provide the capability to shift load from one substation to another during emergencies or for substation maintenance. Finally, to improve the ability to restore the system after a major outage, Virginia Tech Electric is currently developing and implementing increased monitoring and diagnostic capabilities. This will include extensions of the computerized load monitoring and control system (SCADA), the installation of fault indicators on both the overhead and underground systems, and the development of an outage analysis/management system.

# GENERAL POLICIES

- Support the development and maintenance of a highly reliable, efficient, and environmentally sound electrical infrastructure.
- Provide cost-effective, energy efficient street lighting appropriate to the use and character of the area.
- Support programs to increase energy efficiency within the region such as the use of solar, wind, and other decentralized technologies.
- Require that all service drops and other new installations, in Town and in adjacent areas, be constructed underground even in areas with current overhead service, and encourage utility companies to bury existing overhead facilities.
- Encourage the use of ditch sharing between utility companies to avoid separate parallel ditches.
- Reduce light pollution throughout Town including the Virginia Tech campus.
- Joint planning and cost share projects between the town and utility companies are encouraged.

# ACTION STRATEGIES

## *in general*

- Encourage all utility franchisees to implement and maintain Best Available Technology (BAT) practices and infrastructure.
- Emphasize conversion to underground utilities during franchise negotiations.
- The town holds streets, rights-of-way, and public utility easements in trust for the use of the public, which are finite assets that interest multiple users.
- The value of rights-of-way as a public asset has increased, as more utility and communications providers have become interested in serving Blacksburg residents. The town has an obligation to charge fair compensation for the use of this asset.
- The town has the duty to manage its rights-of-way and easement assets wisely for the public good. This includes, but is not limited to, adopting reasonable regulations for utility separation, the timing and coordination of the work in the right-of-way, safety rules and regulations, and the preservation of the streets in a condition to best serve the travelling public.

## *within 5 years*

- Require the installation of sharp cutoff cobra-head lights on all existing and new street lights, except in downtown areas, to direct light downward rather than out, creating less light pollution.

- Install street lighting with metal halide, and period post top lights in the downtown area, including adjacent neighborhoods as appropriate.

- Convert all utilities to underground service in Town road improvement projects and lay conduit in all Town projects that disturb the right-of-way to provide for future utility relocations.

- Promote the use of Demand Side Management (DSM) to reduce energy use through efficiency improvement devices.

- Priority for the conversion to underground service and upgrades is given to:

  a) The neighborhoods of Highland Park, Apperson, Murphy, Carlson, and along Turner, Clay, Progress, Patrick Henry, and North Main streets;
  b) Utility facilities that have a high visual impact on the surrounding area;
  c) Areas that require frequent maintenance;
  d) Areas where the utility company has line replacements scheduled and the town can participate to place the line underground.

- Upgrade distribution facilities at the Corporate Research Center and reconductor facilities along the Giles Road corridor.
- Complete the new Tech Electric substation in 2001.
- Install standard sodium vapor street lighting on all collector and arterial roads.

## *within 25 years*

- Consider alternate street lighting within neighborhoods on local streets that is appropriate to the character of the area, available through the electric utility, and where any excess cost is paid by the neighborhood residents or commercial property owners.

- Virginia Tech Electric will replace overhead lines underground in areas typically requiring high maintenance.

- Virginia Tech Electric will install new telemetry meters at all connections with SCADA systems on poles transferring information through remote sensing technology.

- Virginia Tech Electric will install SCADA remote control for not only substation control but also for switches between circuits.

# NATURAL GAS SERVICE

***Description***

**United Cities Gas Company Franchise**
The United Cities Gas Company, under a 20-year franchise that extends until December 1, 2006, provides natural gas service to approximately 4,600 customers in Town. Gas service is provided to the town through a six-inch diameter steel transmission line at 100 pounds of pressure that is reduced down to 60 pounds at the regulator station that serves the Blacksburg area at the Hubbard Street and South Main Street intersection. The town is also fed through an eight-inch diameter steel distribution line at 150 pounds of pressure, which is reduced down to 100 pounds at the regulator station near National Drive in Christiansburg. The peak demand on the system in 2000 was 295,000 MCF (thousand cubic feet) per month. The system has adequate capacity to supply this demand.

**Interruptable Service Option**
Service is adequate to provide for the demand generated in the industrial areas of Town. In addition, an interruptible service option is available to industries and large commercial users whereby a lower rate for the gas service is paid and, when demand indicates, the interruptible service customers are asked to limit or stop their gas use in order to redirect supply to residential customers. Every winter there are times when the interruptible service is rerouted to residential customers. This system has prevented service shortages and brownouts to regular gas customers, and the system will be maintained so that there will be no brownouts, according to the United Cities Gas Company.

## *Opportunities*

- Natural gas service is available to most areas of Town.
- The interruptible service option enables lower costs to industrial customers and improves service reliability during periods of extreme demand.

## *Challenges*

- Maintain rates that are competitive with, or lower than, other energy sources in the region.

## *What is Changing*

**Gas Service Enhancements**
Expansions and improvements to the system are based on growth and demand.

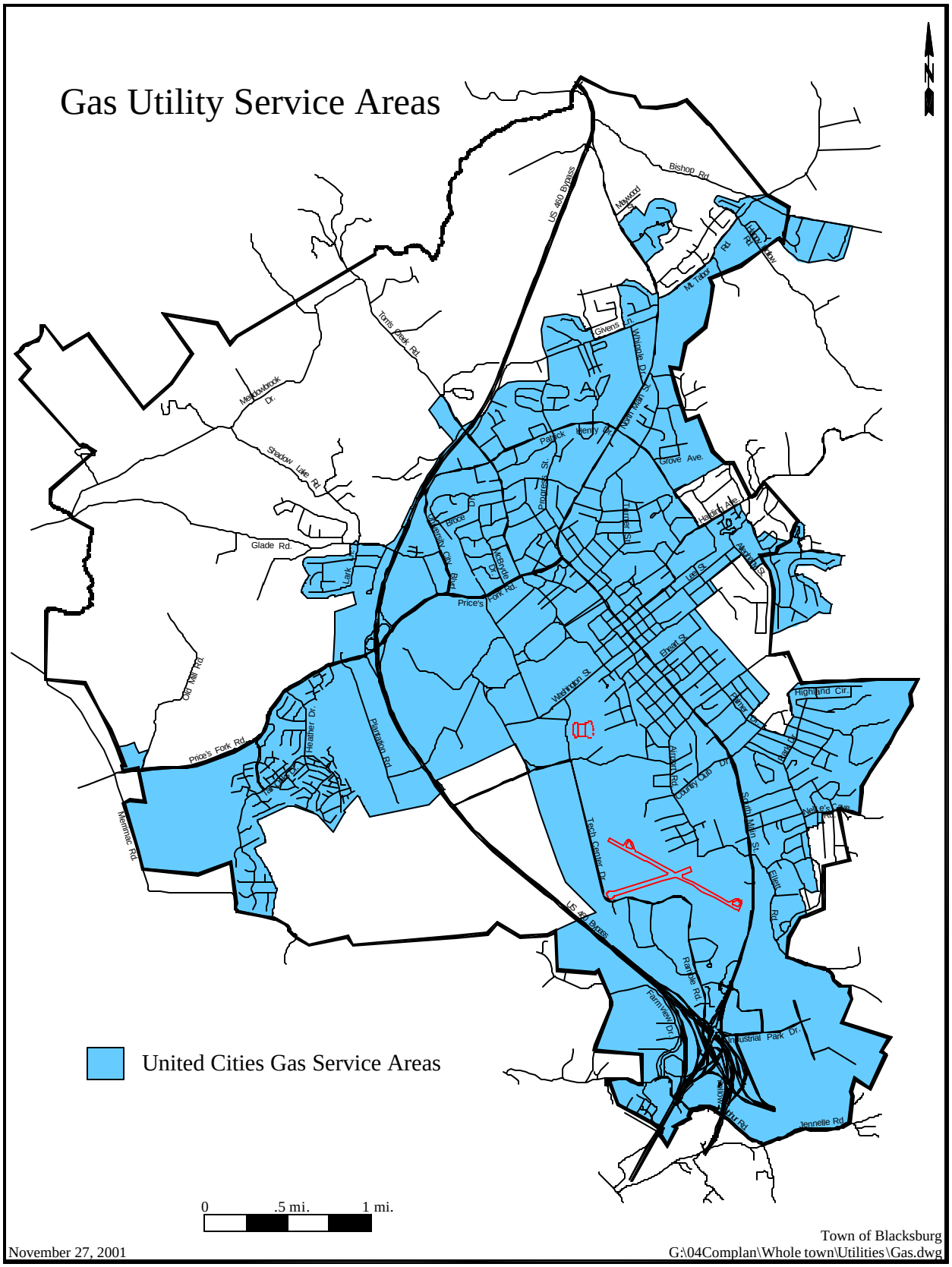


***Figure US-25, Gas Utility Service Areas***

# GENERAL POLICIES

- Support the development and expansion of natural gas service that is reliable and cost effective.
- Support proper maintenance to assure safe and consistent service.
- Support service levels that are responsive to customer needs.

# ACTION STRATEGIES

## *in general*

- Encourage all utility franchisees to implement and maintain Best Available Technology (BAT) practices and infrastructure.
- The town holds streets, rights-of-way, and public utility easements in trust for the use of the public, which are finite assets that interest multiple users.
- The value of rights-of-way as a public asset has increased, as more utility and communications providers have become interested in serving Blacksburg residents. The town has an obligation to charge fair compensation for the use of this asset.
- The town has the duty to manage its rights-of-way and easement assets wisely for the public good. This includes, but is not limited to, adopting reasonable regulations for utility separation, the timing and coordination of the work in the right-of-way, safety rules and regulations, and the preservation of the streets in a condition to best serve the travelling public.
- Atmos, the current owner of United Cities Gas, is striving to be the largest provider of gas distribution services east of the Rocky Mountains that boasts a superior customer satisfaction rating and the lowest operation and maintenance costs per customer of any competitor.

## *within 5 years*

- Encourage the expansion of natural gas service to new developments.
- Encourage system expansions that accommodate anticipated commercial and industrial growth.
- Require the best available safety measures and practices in franchise negotiations.